4.5 HYDROLOGY AND WATER QUALITY

This section describes the hydrology and water quality in the vicinity of the Project, and analyzes potential Project impacts on surface water and groundwater. Wetlands are discussed in the Biological Resources section.

4.5.1 Environmental Setting

Groundwater Resources

The existing pipeline is underlain by aquifers located in the California Central Valley and Mojave Desert aquifers. Each is described in the following.

Central Valley Aquifers

The Central Valley fresh water aquifers generally consist of continental derived deposits that are younger than Eocene age (Bertoldi et al. 1991). The alluvial and lacustrine deposits consist of clay, silt, sand, and gravel (Page 1986). The Central Valley aquifers are primarily recharged by surface water from streams that flow into the valley from the Sierra Nevada, which form the eastern boundary of the valley. Irrigation is the primary use of groundwater in the Central Valley. Historically, withdrawals of groundwater have resulted in severe ground subsidence, mainly in the western portions of the valley (Bertoldi et al. 1991). Increased use of surface water provided by the State Water Project and Central Valley Project has reduced the rate of groundwater withdrawal and reduced or eliminated subsidence.

Depth to groundwater in the Central Valley depends on the amount of pumping that has taken place in any given area. The pre-development water table in the Project area may have varied from 50 to 100 feet below ground surface (bgs), but the water table may be considerably deeper at present (Bertoldi et al. 1991).

The groundwater quality depends on recharge water (Bertoldi et al. 1991). The groundwater on the eastern side, or recharge areas of the valley, is generally lower in total dissolved solids (TDS). TDS levels over the valley range from less than 200 milligrams per liter (mg/l) on the east to over 1,500 mg/l in the southwestern portions of the valley. The TDS concentrations in the groundwater in the vicinity of the Project range from over 200 to less than 1,500 mg/l, with the lower concentrations found near the Tehachapi Range. In the southern Central Valley, sodium and calcium are the dominant cations, and sulfate and bicarbonate are the dominant anions. In the Project area, the dominant cations are sodium and calcium, and the dominant anions are chloride and sulfate.

The water quality in the Central Valley has been affected by agricultural activities; common contaminants are nitrates and pesticides (Bertoldi et al. 1991). Selenium also presents a water quality concern in Central Valley aquifers. Although selenium is naturally present in soils and groundwater of the Central Valley, irrigation return flows have contributed to higher concentrations of selenium in surface waters, which has caused adverse impacts on waterfowl, including high death rates and birth defects.

Mojave Desert Aquifers

Aquifers in the Mojave Desert are either composed of basin fill deposits or consolidated rocks (Bedinger et al. 1983). The basin fill deposits are primarily unconsolidated alluvial materials composed of clay, silt, sand, and gravel that are derived from erosion of the mountain ranges. The consolidated rock aquifers may consist mainly of sedimentary and volcanic rocks but also are composed of igneous and metamorphic rocks (Langer et al. 1983). The consolidated rocks are of lesser importance for water supply because there are fewer wells tapping these aquifers and the wells have lower yield. The basins are generally closed and commonly the groundwater flows to the center of the basins, which usually results in groundwater levels being closer to the surface than at the basin perimeters. Generally, groundwater withdrawal from these aquifers for domestic and industrial uses is limited due to poor water quality.

The depth to groundwater in the Mojave Desert basin fill aquifers varies from near the surface to over 500 feet (Langer et al. 1983). In the aquifers that underlie the Project, the depth to groundwater varies from over 500 feet bgs at Midland (MP 276.00) to less than 10 feet bgs in the Colorado River alluvial valley in the Blythe area. Groundwater levels also may be 15 feet or less bgs where the pipeline crosses Troy Dry Lake (MP 148.00 to 150.00), and near Mettler (MP 5).

The groundwater quality in the Mojave Desert area is variable, with TDS values ranging from less than 200 to over 10,000 mg/l (Thompson et al. 1983). TDS concentrations of more than 200,000 mg/l can be found in wells in the Cadiz Valley, in the southeastern Mojave Desert. TDS values of groundwater from wells in the Project area range from approximately 250 mg/l near the Town of Mojave to more than 280,000 mg/l in the vicinity of Danby Dry Lake.

Groundwater quality in the Mojave Desert has been affected by land use. In the Project area, the alluvial aquifer of the Mojave River in the Barstow area has been heavily contaminated (Hughes 1975). Several historical contamination sources have been identified, including municipal and industrial wastewater, wastewater generated by the US Marine Corps Supply Center, and mineral processing wastes. In the southeastern Mojave region, high concentrations of TDS preclude much of the groundwater for serving as potable water sources (EPA 2000b—g).

Public and Private Water Supply Wells

There are no designated sole source aquifers in the Project area (EPA 1999). There are no protected watersheds in association with water supply wells near the proposed construction locations.

No public water supply wells were identified within 150 feet of proposed construction locations (CDWR 2000, California Department of Health Services 2000). Shallow groundwater sources are more vulnerable to contamination that deep sources.

Surface Water Resources

Because of the arid climate of the region, surface water resources are generally scarce in the Project area. Most watercourses are intermittent, and flow is present during infrequent precipitation events. Other important water resources consist of playa lakes and isolated spring- and seep-fed wetlands. Except in the area near Blythe (MP 303.5), the Project is located in areas of closed basins of internal drainage.

The Mojave and Colorado Rivers are the major streams in the Project area. The Mojave River is intermittent throughout most of its length from its origin in the San Bernardino Mountains to its ultimate discharge point at Soda Lake in the eastern Mojave Desert (Norris and Webb 1990). The Mojave River basin is characterized by extreme variability of annual runoff, ranging from 4,340 acre-feet in 1951 to 345,000 acre-feet in 1922. Flow data from a gauging station on the Mojave River at Barstow, California, indicate long periods of no recorded flow, with occasional flows recorded at irregular intervals over the 68-year period from 1931 to 1999 (USGS 2000). A peak flow was recorded in 1938 at over 17,500 cubic feet per second (cfs). The pipeline crosses or is within the alluvial valley of the Mojave River between approximately MP 114.50 to MP 127.50.

When present, the quality of the water in the Mojave River has been degraded by pollution. The State of California has reported that the Mojave River is use-impaired throughout much of its length due to contamination (EPA 2000a).

The Colorado River is located east of Blythe, California, and the existing pipeline crosses the river at approximately MP 302.8 to MP 302.9. There are no Project activities in the vicinity of the Colorado River. The river drains an area of 244,000 square miles and discharges into the Gulf of California in Mexico (EPA 2001). Flows on the river are controlled by a series of dams. The closest upstream dam is the Palo Verde Dam, a few miles north of where the pipeline crosses the river. For the period from 1988 to 1999, flow downstream of the dam averaged about 6,000 cfs, with seasonal variations from 1,000 cfs in winter to commonly over 12,000 cfs in May and June—the peak runoff period for the Colorado River basin (USGS 2001). The controlled flows on the river generally preclude flooding except during periods of very high runoff from the Colorado River watershed. Salinity is an important water quality problem on the lower Colorado River (EPA 2001).

Field surveys identified no perennial waterbodies within or immediately adjacent to the proposed construction locations. No waterbodies greater than 100 feet wide would be crossed.

Waterbody crossings affected by construction are limited to dry washes. There are, therefore, no applicable State water quality or beneficial use classifications. The locations of washes are presented on the ROW resource maps in Appendix A. Table 4.5-1 summarizes the locations and characteristics of drainages within proposed construction locations on Line 1903.

The Cadiz Lateral crosses a total of ten jurisdictional waters of the US. These waters are intermittent channels varying in width from 10 feet to 40 feet. It should be noted that along the northern portion of the Cadiz Lateral, there are several areas that receive overland sheet flow during precipitation events. However, these areas do not exhibit definable channels or bed and bank conditions, and thus were not determined to be jurisdictional and are not included in the 404 permit application.

Table 4.5-1. Jurisdictional Waters of the United States in Construction Locations on Line 1903

Mile-post	Name	Type	Substrate	Ordinary High Water Mark (feet)	Water Depth (feet)	Width (feet)	Riparian Vegetation Present (Yes/No)	Comments
Line 1903								
22.00	Chanac Creek	Intermittent	Sand and gravel	2.0	0.0	40.0	No	
22.54	Unnamed	Intermittent	Sand and gravel	0.5	0.0	1.0	No	
31.00	Unnamed	Intermittent	Sand	3.0	0.0	10.0	No	
44.00	Unnamed	Intermittent	Sand	2.0	0.0	20.0	No	
44.59	Unnamed	Intermittent	Muck	2.0	0.5	35.0	Yes	Channel 1
44.59	Unnamed	PEM/PSS[1]	NA	NA	NA	NA	Yes	Wetland
126.00	Unnamed	Intermittent	Sand	1.0	0.0	5.0	No	
175.00	Unnamed	Intermittent	Sand and gravel	0.5	0.0	5.0	No	Channel 1
175.00	Unnamed	Intermittent	Sand and gravel	0.5	0.0	5.0	No	Channel 2
176.57	Unnamed	Intermittent	Sand and gravel	1.0	0.0	5.0	No	
187.10	Unnamed	Intermittent	Sand and gravel	2.0	0.0	7.0	No	
196.57	Unnamed	Intermittent	Sand and gravel	2.0	0.0	37.0	No	
215.75	Unnamed	Intermittent	Sand	2.0	0.0	60.0	Yes	
228.30	Unnamed	Intermittent	Sand and gravel	1.0	0.0	6.0	No	
262.70	Unnamed	Intermittent	Sand and gravel	1.0	0.0	4.0	No	Channel 1
262.70	Unnamed	Intermittent	Sand and gravel	1.0	0.0	30.0	No	Channel 2
265.58	Unnamed	Intermittent	Sand and gravel	0.5	0.0	660.0	No	Large wash system
267.00	Unnamed	Intermittent	Sand	1.0	0.0	15.0	No	
276.00	Unnamed	Intermittent	Sand and gravel	2.0	0.0	20.0	No	
279.10	Unnamed	Intermittent	Sand	1.0	0.0	12.0	No	
279.47	Unnamed	Intermittent	Sand	0.5	0.0	20.0	Yes	
280.60	Unnamed	Intermittent	Sand and	2.0	0.0	300.0	Yes	

			gravel					
286.30	Unnamed	Intermittent	Sand	0.5	0.0	15.0	Yes	Channel 1
286.30	Unnamed	Intermittent	Sand	0.5	0.0	15.0	Yes	Channel 2
Cadiz Lateral								
0.82	Unnamed	Intermittent	Sand and gravel	1.0	0.0	15.0	No	
1.11	Unnamed	Intermittent	Sand	2.0	0.0	25.0	No	
1.17	Unnamed	Intermittent	Sand	1.0	0.0	10.0	No	
1.35	Unnamed	Intermittent	Sand	1.0	0.0	30.0	No	
2.03	Unnamed	Intermittent	Sand	1.0	0.0	15.0	No	
3.56	Unnamed	Intermittent	Sand	2.0	0.0	40.0	No	
3.77	Unnamed	Intermittent	Sand	2.0	0.0	0.0	No	
3.80	Unnamed	Intermittent	Sand	1.0	0.0	35.0	No	
3.96	Unnamed	Intermittent	Sand	1.0	0.0	20.0	No	
6.03	Unnamed	Intermittent	Sand	3.5	0.0	10.0	No	

[1]Palustrine emergent/palustrine scrub shrub.

In addition to construction activities directly at these intermittent streams, water would also be obtained at Brite Lake in the Tehachapi Mountains (MP 32.56) and from the Palo Verde Water District irrigation canals from the Colorado River (MP 300.00) in order to hydrostatically test the Line 1903 and the Cadiz Lateral. Test waters would be discharged into evaporation ponds to be constructed on private land adjacent to the ROW at the Twelve Gauge Pump Station (MP 105.8), and at the Cadiz Pump Station (MP 215.75).

Public Watershed Areas

The pipeline crosses several watersheds. From west to east, those watersheds are Tulare-Buena Vista Lakes, Middle Kern-Upper Tehachapi-Grapevine, Antelope-Fremont Valleys, Coyote-Cuddleback Lakes, Mojave, South Mojave, and Imperial Reservoir (EPA 2000a—g). None of the watersheds listed is designated as a protected watershed.

4.5.2 Regulatory Setting

Federal

Clean Water Act

The Clean Water Act (CWA) authorizes the US Environmental Protection Agency (EPA) to regulate discharges of storm water into surface waters by using National Pollutant Discharge Elimination System (NPDES) permits and pretreatment standards. The State Water Resource Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) implement these permits at the state level. The CWA requires the control of soils erosion during construction through the preparation and execution of site-specific soil erosion control plans. The US Department of Agriculture (USDA) National Engineering Handbook (1983) prescribes standards of technical excellence for the planning, design, and construction of soil conservation practices. The administering agency for the above authority is the National Resource Conservation Service (NRCS) (formerly known as the Soil Conservation Service). Applicable standards would be incorporated into the UECRM Plan (Appendix D1), SWPPP (Appendix D3), and Dust Control Plan (Mitigation AIR-1c) for the Project.

Clean Water Act (33 USC Sections 1251 et seq.)

The CWA regulates activities that result in discharges of fill or dredged material into waters of the United States, including rivers, streams, and wetlands. The Section 404 program is administered by the USACE. Utility crossings (including pipelines across waterways) are activities regulated by Section 404 of the CWA.

According to discussions with the USACE, Los Angeles and Sacramento Districts, a Section 404 permit would be required for this Project if jurisdictional waters of the United States are impacted by construction activities. Although the USACE has not yet reviewed the Section 404 application, the agency has indicated that the Project likely would be covered under Nationwide Permits 3 and 12. Any additional conditions imposed by the USACE would be implemented by the Applicant and adopted into the MMP if known prior to adoption of the plan.

State

Water quality is regulated under California's Porter-Cologne Water Quality Act, which has established a statewide system for water pollution control (Water Code Sections 13000 et seq.). The Act requires adequate protection of water quality by appropriate designing, sizing, and construction of erosion and sediment controls. Discharge of waste earthen material resulting from land disturbance with the potential to affect the quality of the waters of the State requires the issuance of waste discharge requirements. The RWQCBs are the principal agencies responsible for control of water quality and issuing permits. The SWRCB's General Construction Permit requires that a facility prepare a Storm Water Pollution Prevention Plan (SWPPP) and a Storm Water Management Plan (SWMP). EPNG would comply with the act through implementation of BMPs outlined in the Applicant's SWPPP (Appendix D3) to be submitted to the Lahontan RWQCB for review and approval. EPNG would also obtain an NPDES or comply with Waste Discharge Requirements (WDRs) for the discharge of hydrostatic test water.

The Lahontan RWQCB also would require Section 401 water quality certification. This certification is required for construction within the 100-year floodplain of perennial watercourses.

California Fish and Game Code (Section 1600)

The California Fish and Game Code requires the CDFG to conserve, protect, and manage California's fish, wildlife, and native plant resources. Section 1600 of the Code regulates activities occurring within waters of the State, including rivers and streams. Should CDFG determine that a proposed activity may adversely affect fish or wildlife resources, a Streambed Alteration Agreement is required. Notification to CDFG applies to any activity that would divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake; use material from a streambed; or result in the disposal or deposition of waste, or any other material where it can pass into any river, stream, or lake.

EPNG has submitted a completed Streambed Alteration Agreement form and questionnaire to CDFG for approval. Any additional conditions imposed by CDFG would be implemented by the Applicant and adopted into the MMP if known prior to adoption of the plan.

4.5.3 Significance Criteria

An adverse impact on groundwater would be considered significant and would require mitigation if Project construction or operation would:

- alter the flow of groundwater to local springs or wetland areas;
- interrupt or degrade groundwater used for private or municipal purposes; or
- result in either short- or long-term violation of Federal, or State agency numerical water quality standards or water quality objectives.

An adverse impact on surface waters was considered significant and would require mitigation if Project construction or operation would:

- result in either short- or long-term violation of Federal, or State agency numerical water quality standards or water quality objectives;
- alter channel bed armoring, bank composition, or stream hydraulic characteristics such that it results in short- or long-term erosion or so that the banks of a waterway must be armored to reduce short- or long-term erosion;
- cause the resuspension of contaminated bottom sediments that would degrade the quality of water downstream in violation of Federal or State agency water quality standards;
- result in increased sedimentation that adversely affects the operation of irrigation water control structures, gates, or valves or the quality of municipal water supply reservoirs;
- reduce stream flow quantity where such a flow change would significantly damage either beneficial uses or aquatic life;
- increase the potential for flooding outside the stream channel;
- place permanent structures within the 100-year floodplain that would be damaged by flooding;

- increase soil or wind erosion rates or sedimentation such that degradation of water quality standards would result; or

- degrade the integrity of structures , such as (bridges, pipelines, and utilities) due to erosion and improper conveyance of stormwater during construction and operation.

4.5.4 Impact Analysis and Mitigation

Surface Waters

No sensitive surface waters would be affected by proposed construction activities (EPA 2000a—g). No crossings of navigable waterways have been identified for this Project. All surface waterbodies affected by construction activities association with the proposed Project are intermittent. When no flow is present in surface waterbodies, trenching would be used to expose the existing Line 1903 for repairs and to build the Cadiz Lateral. The Project proposes to avoid construction in intermittent waterbodies during periods of high flow and to monitor weather conditions up to two days in advance of waterbody crossings to minimize the potential for construction across intermittent waterbodies to occur during runoff events. If perceptible flow conditions develop during construction, the Applicant would:

- remove all equipment from the streambanks;

- restore the banks to their original shape (as close as possible) to keep the flow within the banks of the stream by utilizing soil, straw bales, silt fence, or other means deemed appropriate by regulatory agencies;

- continually monitor the banks where the crossing was attempted and restore any banks that are eroded by flow; and

- defer construction for hours or days to allow flow to subside before resuming work.

If it becomes apparent that the waterbody may continue flowing for weeks or months, the Applicant would reenter the waterbodies using the methods proposed in the WWCM (Appendix D2). These methods include:

- locating all extra work areas at least 50 feet away from waterbody boundaries in non-cultivated areas where topographic conditions permit;

- limiting clearing of vegetation between extra work areas and the edge of the waterbody to preserve riparian vegetation;

- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;

- restricting storage and refueling activities near surface waters; restricting spoil placement near surface waters;

- limiting use of equipment operating in the waterbody to that needed to construct the crossing;

- requiring construction across waterbodies to be completed as quickly as possible and during the windows specified in the plan or required by applicable permits;

- requiring temporary erosion and sediment control measures to be installed across the entire width of the construction right-of-way after clearing and before ground disturbance;

- requiring maintenance of temporary erosion and sediment control measures throughout construction until streambanks and adjacent upland areas are stabilized;

- requiring bank stabilization and reestablishment of bed and bank contours and riparian vegetation after construction; and

- limiting post-construction maintenance of vegetated buffer strips adjacent to streams.

Following construction activities, all river, stream, and wash banks cut would be restored to their original slope and grade. Additionally, erosion control measures outlined in the UECRM plan (Appendix D1) would be implemented. These include, but are not limited to the following:

- installation of temporary slope breakers during construction to reduce runoff velocity and divert water off the construction right-of-way to appropriate areas away from wetlands, waterbodies, or other sensitive resources (slope breakers would not be installed on agriculture or residential areas unless requested by landowners);

- installation of sediment barriers during construction to sop the flow of sediment into sensitive resources;

- bank stabilization and reestablishment of bed and bank contours;

- construction revegetation and application of mulch to promote slope stability and limit dust generated due to wind and water;

- installation of permanent trench breakers intended to slow the flow of subsurface water along trenches; and

- installation of permanent slope breakers to reduce runoff velocity and divert water off the construction ROW and to prevent sediment deposition into sensitive resources (slope breakers would not be installed on agriculture or residential areas unless requested by landowners);

These measures proposed by EPNG are expected to reduce potential impacts to stream hydraulic characteristics from erosion or construction activities to less than significant levels. These restorative measures would minimize the potential to increase flooding outside the existing stream channels or to cause increased sedimentation in the streams during periods of flow to less than significant levels. Additionally, they would prevent the improper conveyance of stormwater during construction and operation of the Project that could degrade the integrity of structures near the Project, such as nearby pipelines.

Water quality in the intermittent streams listed in Table 4.5-1 could potentially be affected by the Project. Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters creates a potential for contamination if a spill were to occur. As discussed in Section 4.6, Hazards and Public Safety, the Applicant has prepared a SPCC Plan to prevent the spillage of hazardous materials during construction. This plan, combined with the erosion control measures listed above, would adequately prevent and mitigate any potential impacts to water quality in streams in and adjacent to the Project to a less than significant level.

Hydrostatic Testing

EPNG would verify the integrity of Line 1903 and the Cadiz Lateral before placing them into service by conducting a series of hydrostatic tests. These tests involve filling the pipeline with water, pressurizing it, and then checking for pressure losses due to pipeline leakage.

Hydrostatic test water would be obtained at Brite Lake in the Tehachapi Mountains (MP 32.56) and from the Palo Verde Water District irrigation canals from the Colorado River (MP 300.00). Test waters would be discharged into evaporation ponds to be constructed on private land adjacent to the ROW at the Twelve Gauge Pump Station (MP 105.8), and at the Cadiz Pump Station (MP 215.75). Approximately 28 million gallons of water would be required to hydrostatically test the pipeline. No chemicals would be used during hydrostatic testing of the pipeline, although some residual organic material could remain on the interior of the pipe and be transferred to the water. Following testing, the two evaporation ponds would be abandoned and the sites recontoured to pre-construction grades.

Discharge of hydrostatic test water would be regulated by the NPDES permit. EPNG would acquire the necessary permit from State agencies before withdrawing or discharging hydrostatic test water, including specific approvals from applicable resource agencies. Discharge would be disposed of according to the conditions of the NPDES permit.

Additionally, EPNG would minimize the potential for any effects to recreational, industrial, or biological uses by adhering to the hydrostatic testing measures included in its WWCM Procedures (Appendix D2). These measures include screening the intake hose to prevent entrainment of fish and maintaining adequate flow rates in waterbodies used as sources to protect aquatic life and waterbody uses. If withdrawal and discharges are conducted according to EPNG's WWCM Procedures and in compliance with NPDES and other applicable permit requirements and DOT pipeline safety regulations as set forth in Title 49 CFR Part 192, the impacts of hydrostatic testing on water resources would be less than significant.

Flood Hazards

Severe flooding can affect aboveground facilities and buried pipe. In arid regions, flooding may be infrequent but severe. Where coverage exists, flood insurance rate maps issued by the Federal Emergency Management Agency (FEMA) for 1995 and 1997 (Environmental Systems Research Institute 2001) were reviewed to determine what Project components and proposed aboveground facilities are located within 100-year flood hazard areas. Table 4.5-2 summarizes flood hazard areas where mapped coverage exists. Flood hazards, including debris flows, may be of special concern along alluvial fan pediments adjacent to mountain slopes.

All aboveground facilities are outside of the 100-year flood plain with the exception of the proposed valve at MP 32.36, which is in the 100-year floodplain of a small unnamed stream. Several valves and metering facilities are located in areas not covered on printed FEMA maps at MP 98.7 and from MP 132.0 to MP 303.5.

EPNG's design for the Cadiz Lateral and conversion of Line 1903 has been developed to minimize flood-related erosion. The new valve sites and metering facilities are designed according to DOT standards outlined in 40 CFR Part 192. Among other measures, these standards require valves to be built on a concrete pad that protects the valves from potential flood or erosion damage. As described above, EPNG has also outlined several permanent erosion control measures it its UECRM plan (Appendix D1) to prevent the degradation in integrity of all Project structures, including valves. These measures would make it unlikely that flooding would damage the integrity of Valve #19 or any other aboveground facilities. Assuming that EPNG implements all components of the UECRM plan and complies with all DOT standards outlined in 40 CFR Part 192, potential impacts to these structures would be less than significant.

Table 4.5-2. Line 1903 Components Located in 100-Year Flood Hazard Areas

Approximate Milepost	Drainage/Waterbody	Proposed Permanent Aboveground Facility
4.20–5.50	Tecuya Creek	None
10.50–12.00	El Paso Creek	None
32.00–33.00	Unnamed	Proposed Valve #19
33.20–33.30	Brite Creek	None
35.50–35.60	Water Canyon	None
38.30–38.40	Antelope Canyon Creek	None
40.30–40.40	Buckhorn Canyon Creek	None
55.60–56.80	Unnamed	None
60.40–60.50	Unnamed	None
61.30–61.40	Unnamed	None
66.00–82.50	No flood zone map coverage	None
84.15–84.25	Unnamed	None
86.50–116.50	No flood zone map coverage	Proposed Valve #15
119.80–-120.00	Mojave River floodplain	None
123.45–-123.60	Mojave River floodplain	None
126.15–126.55	Mojave River floodplain	None
128.00–132.00	No flood zone map coverage	None
132.00-302.50	No flood zone map coverage	Proposed Valve #2, 3, 4, 5, 6, 7, 8, 9, 10, 11; Metering facilities at Amboy; metering station and valve on Cadiz Lateral.
302.50-303.00	Colorado River floodplain	None

Groundwater Resources

Construction of the pipeline and aboveground facilities could affect groundwater in several ways. Clearing, grading, trenching, and soil stockpiling activities could temporarily alter overland flow and groundwater recharge patterns. Near-surface soil compaction caused by heavy construction equipment/vehicles could reduce the soil's ability to absorb water, which could increase surface runoff and the potential for ponding. The duration and magnitude of these effects would be temporary and minor (see Section 4.4, Geology and Soils). Construction in any one area would be completed in a matter of weeks. In addition, implementation of EPNG's mitigation measures outlined in the UECRM plan (Appendix D1) as described above would reduce these impacts to groundwater to less than significant levels.

The maximum depth of burial of the pipe is less than 10 feet. Groundwater, where tested, was less than this depth at all locations except the immediate vicinity of the Colorado River. No pipe replacement is planned near the Colorado River. If trench dewatering becomes necessary, could cause temporary fluctuations in the elevation of the water table. Trench dewatering would be potentially conducted only in areas with a shallow water table. The duration of these operations would be short, typically several days or less. As a result, impact on groundwater associated with trench dewatering would be less than significant.

The alternation of the natural soil strata by trenching and other earthwork could eliminate some existing groundwater pathways or result in new migration pathways for groundwater, particularly in one wetland area present on the line. As described in the UECRM plan (Appendix D1), EPNG would restore confining soils breached during construction and would place trench breakers in the trench, on slopes, and at the base of slopes adjacent to wetlands and waterbodies as necessary to prevent groundwater and surface water migration along the pipeline/trench. EPNG would restore surface contours to ensure original overflow and recharge patterns are reestablished following construction. EPNG's implementation of these measures would reduce impacts on groundwater to less than significant.

As discussed above, groundwater quality could be degraded if fuel, oil, or other hazardous materials were spilled in association with construction and operation activities of the Project. EPNG has developed a SPCC plan (Appendix D4) to prevent potential impacts on groundwater quality. In addition, trenching activities during construction could potentially reveal contaminated water or soils in the Project area that could pose a threat to groundwater quality if construction activities facilitated the spread of the contamination. As described in Section 4.6, Hazards and Public Safety, EPNG has developed a Contaminated Soils Plan (Appendix D9) for implementation during construction activities. The plan describes testing requirements, significance criteria, and remediation methods to be applied in the event that contaminated soils are encountered. These measures would reduce potential impacts to water quality of groundwater resources to less than significant.

Impact WQ-1: Potential Impacts on Private or Public Water Supplies

Construction activities could affect quality or yield of private or public water supplies. (Potentially Significant, Class II)

No public water supply wells were identified within 150 feet of proposed construction locations (CDWR 2000, California Department of Health Services 2000). Field surveys conducted between December 2000 and April 2002 identified one groundwater irrigation well within 150 feet of the proposed evaporation pond location at MP 33.05. Lists of permitted water wells also were reviewed to determine whether water wells are within 150 feet of other construction locations (CDWR 2000). However, the lists did not provide accurate location information. Although adverse impacts on groundwater resources are not anticipated, trenching could cause temporary damage or changes in water levels at water wells within 150 feet of Line 1903 and the Cadiz Lateral.

Mitigation for Impact WQ-1:

MM WQ-1. ***Protection of Private and Public Water Supplies.*** *At least sixty days prior to construction, the Applicant would contact landowners to identify the location of all private wells within 200 feet of approved construction workspaces. In these and other areas of potential groundwater impact, special precautions would be taken to ensure protection of groundwater. Precautions include prohibiting refueling operations and storing hazardous liquids within a 200-foot radius of any identified private well or within a 400-foot radius of any public water supply wells.*

The Applicant would communicate with the nearby well owners to determine changes in yield and discoloration during construction. With landowner permission, wells and springs within 200 feet of the construction ROW would be sampled prior to construction to obtain water quality and yield data for each sampling point. EPNG would conduct biological monitoring at isolated springs to determine any adverse impacts on riparian communities in the ROW. Post-construction well monitoring would be conducted as requested by the well owner or for disputed situations.

In the event that any well is damaged by construction activities, the Applicant would provide a temporary source of water and would restore the well to its original capacity or provide other remedies as agreed on in writing with the user of the affected well. Within 30 days of placing the facilities in-service, *EPNG would file a report with CSLC, BLM, and FERC describing any complaints received from landowners about water quality or yield, the results of the biological monitoring at any isolated springs, and the remedial action taken to address concerns.*

Rationale for Mitigation. These mitigation measures would identify any potential groundwater wells and reduce potential impacts to these wells through awareness of the proximity of the resources. These measures also involve reporting of direct impacts and provide on-site or offsite mitigation for impacts. After implementation of this mitigation measure, impacts on private or public water supplies would be less than significant.

Table 4.5-3 presents a summary of impacts on hydrology and water quality and recommended mitigation measures.

Table 4.5-3. Summary of Impacts and Mitigation Measures for Hydrology and Water Quality

Impact	Mitigation Measure
WQ-1: Potential Impacts on Private or Public Water Supplies	**WQ-1.** Protection of Private and Public Water Supplies

4.5.5 Cumulative Impacts

In addition to the proposed Project, other projects may contribute to cumulative impacts on water resources in the vicinity of the Project. The projects potentially contributing to cumulative impacts in the vicinity of the Project are discussed in Section 5.5, Summary of Cumulative Impacts. The proposed Project is not expected to significantly affect water resources. All streams and waterbodies in the Project area are intermittent. Construction activities would occur during periods of low to no flow. Any potential impacts would be temporary. As discussed in Section 4.5.4, Impact Analysis and Mitigation, it is possible that private irrigation or drinking water wells exist near construction areas of the proposed Project. If the Project negatively affected the yield or quality of water in these wells, such impacts could be compounded if construction or operation of any of the other projects in the vicinity simultaneously affected the yield or quality of groundwater resources in the same area. The only known well within 200 feet of Project construction activities is a groundwater irrigation well within 150 feet of the proposed evaporation pond location at MP 33.05. No other projects are known to be planned for this area, although projects in the region could affect water resources at MP 33.05. Because any Project-related impacts would be temporary, it is unlikely that significant cumulative impacts on water resources would occur as a result of the proposed Project.

4.5.6 Alternatives

No Project Alternative

The No Project Alternative would not convert the former All American crude oil pipeline system to a natural gas transmission system. Therefore, no impacts associated with Project construction or operations would occur to surface water or groundwater resources.

Ehrenberg to Daggett Alternative

The Ehrenberg to Daggett Alternative would not convert the portion of Line 1903 from MP 0 to MP 132.1. The alternative would avoid potential impacts on groundwater in the San Joaquin Valley and Tehachapi Range. This alternative would avoid any potential impacts to the one known groundwater well within 150 feet of the Project at MP 33.05, although other wells could exist in the Project area of the alternative. The alternative would avoid construction work in 7 of the 34 USACE-jurisdictional waters in the Project area. The alternative would avoid crossing 16 of the waterbodies with the same risk of flooding. Hydrostatic testing of the line would use water only from the Palo Verde Irrigation District canal. This water would be discharged at the Cadiz Pump Station. Impact WQ-1 noted above would still be an issue for this alternative. This impact would be less than significant after mitigation as described above.

Ehrenberg to Cadiz Alternative

The Ehrenberg to Cadiz Alternative would not convert the portion of Line 1903 from MP 0 to MP 215.75. The alternative would avoid potential impacts on groundwater in the San Joaquin Valley and Tehachapi Range. This alternative would avoid any potential impacts to the one known groundwater well within 150 feet of the Project at MP 33.05, although other wells could exist in the Project area of the alternative. The alternative would avoid construction work in 12 of the 34 USACE-jurisdictional waters in the Project area. The alternative would avoid crossing 16 of the waterbodies with the same risk of flooding. Hydrostatic testing of the line would use water only from the Palo Verde Irrigation District canal. This water would be discharged at the Cadiz Pump Station. Impact WQ-1 noted above would still be an issue for this alternative. This impact would be less than significant after mitigation as described above.

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